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# Bushmeat consumption in West African large urban centres

LUCA LUISELLI<sup>1,2,4</sup>, EMMANUEL M. HEMA<sup>3</sup>, GABRIEL HOINSOUDÉ SEGNIAGBETO<sup>4</sup>, VALY OUATTARA<sup>5</sup>, EDEM A. ENIANG<sup>6</sup>, GNOUMOU PARFAIT<sup>3</sup>, GODFREY C. AKANI<sup>2</sup>, DJIDAMA SIRIMA<sup>3</sup>, BARINEME B. FAKAE<sup>1,2</sup>, DANIELE DENDI<sup>1,2,4</sup> AND JOHN E. FA<sup>7,8</sup>

<sup>1</sup> IDECC - Institute for Development, Ecology, Conservation and Cooperation, via G. Tomasi di Lampedusa 33, I-00144 Rome, Italy

<sup>2</sup> Department of Applied and Environmental Biology, Rivers State University of Science and Technology, P.M.B. 5080, Port Harcourt, Nigeria

<sup>3</sup> Université Ouaga 1 Professeur Joseph KI-ZERBO/CUPD, Laboratoire de Biologie et Ecologie Animales, 09 B.P. 848 Ouagadougou 09 - Burkina Faso

<sup>4</sup> Department de Zoologie, Faculté des Sciences, Université de Lomé, Lomé, Togo

<sup>5</sup> Groupe des Expert en Gestion des Eléphants et de la Biodiversité de l'Afrique, de l'Ouest, Ouagadougou, Burkina Faso

<sup>6</sup> Department of Forestry and Wildlife, University of Uyo, Akwa-Ibom State, Nigeria

<sup>7</sup> Division of Biology and Conservation Ecology, School of Science and the Environment, Manchester Metropolitan University, Manchester M1 5GD, UK

<sup>8</sup> Center for International Forestry Research (CIFOR), Jalan Cifor Rawajaha, Situ Gede, Bogor Barat, Kota Bogor, Jawa Barat 16115, Indonesia

**Abstract** Bushmeat consumption in large Sub-Saharan African cities is perceived as a major threat to the conservation of many species because their considerable population sizes can generate a significant demand for bushmeat. The study of the effect of age, sex and geographic location in bushmeat eating in African cities may offer valuable insights on which population groups to target in behaviour change campaigns. Using 2,040 interviews in six West African cities from four countries, in forest and savannah settings, we analysed the differences between age and sex in people's frequency of bushmeat consumption. Overall, we found similar patterns in all sampled cities. As many as 62.2 % males and 72.1% females replied that they 'would not eat bushmeat at all', though only 12.8% males and 8.8% females mentioned they regularly ate bushmeat. Younger generations of both sexes answered that they 'would never eat bushmeat' more often than older age groups, independently of their city of origin. These trends are encouraging though further research needs to be undertaken to find out whether bushmeat volumes consumed in cities are unsustainable and having a serious impact of prey populations.

**Keywords:** sex; age; geographic location; Togo; Burkina Faso; Nigeria; Niger

No part of the world is urbanizing faster than sub-Saharan Africa, with a projected doubling of the continental population of about 1.1 billion by 2050. Over 80% of that growth will occur in cities, especially in West Africa (World Bank, 2016). This expansion of cities has been due to the heavy immigration from rural to urban areas, with people seeking a better life in the city (World Bank, 2016). Such 'urbanization' process may have positive effects for example in driving the economic development of the continent but will also increase political instability and even cause unprecedented environmental damage (Oates et al., 2004).

The huge population growth in cities no doubt place greater demands on natural resources used as food. Bushmeat is a crucial source of animal protein for many rural Africans and is also eaten by many urban inhabitants, often as a commodity food than a basic need (Fa et al., 2002a,b, 2006; Brashares et al., 2011). However, though bushmeat consumption may be less important in terms of food security in large African cities (Hema et al., 2017; Luiselli et al., 2017a, 2017b), the overall volume consumed could be substantially large and this can have dire consequences on the supplying wildlife populations. Ways of shifting bushmeat consumer preferences in cities are urgently needed to reduce the wildlife consumption in these population centres (van Vliet et al., 2011; Wilkie et al., 2017). More particularly, to better guide future behaviour change campaigns, there is a need to ascertain whether consumer groups to be targeted within a city differ in their desire to eat bushmeat, and if this varies by geographical locations. In this paper, we analyse the responses of over 2,000 interviewees from six large urban centres (all > 500,000 inhabitants) in four West African countries and highlight similarities and differences between them.

We interviewed a total of 2,040 individuals in Nigeria (Port Harcourt, n = 422 and Calabar, n = 452), Togo (Lomé, n = 264), Burkina Faso (Ouagadougou, n = 262), Côte d'Ivoire (Abidjan, n = 368) and Niger (Niamey, n = 271) (Fig. 1). During 2012-2017, we conducted face-to-face interviews using a standardized questionnaire. All interviews were performed by African scientists and students in our group in the local language. Interviewees were selected by randomly choosing persons encountered at marketplaces, canteens, restaurants, roadsides, hairdressing salons, food shops, and other gathering places. This consisted in stopping the first person (we did not interview minors) met after a given time period (in minutes), with the time interval randomly generated by a Random Number Generator. Interviewed persons were informed of the aims of the project and were then asked for their verbal consent before proceeding. In addition, the identity of interviewees was kept anonymous to ensure privacy

(St. John, 2010; Nuno et al., 2014). Interviews followed the ethical guidelines developed by the British Sociological Association and the Code of Conduct for *Oryx* articles.

In each interview, we recorded the interviewees' gender (male or female) and age (18-25 years, 26-50 years,  $\geq 51$  years). To avoid non-independence of the data, we did not question persons in the same family or those living in the same house, even if they were not relatives (Hema et al., 2017).

We asked the following main questions: (1) Do you like eating bushmeat? (2) If yes, we would ask how often they would eat bushmeat and if not, respondents were requested to tell us if they still ate it on occasions. We also asked reasons for consuming (e.g. because bushmeat is a cheaper alternative) or not eating bushmeat, such as the interviewee was not the person choosing the family meal (a frequent case among the younger age-class).

Interviewees were then asked if they ate bushmeat regularly (normally at least once a week but at least 2-3 times per month), occasionally (about once per month or less) or never.

Persons who answered that they consumed bushmeat only occasionally were then asked whether they selected the type of animal, or whether they would just buy/eat whatever species was available or if it was based on its price compared to domestic meat.

Although we informed all interviewees that our study was not linked to any government department, we acknowledge that some level of misrepresentation may have occurred due to fear of repercussions since bushmeat trade is illegal in some countries (e.g. Burkina Faso, see Hema et al., 2017).

To compare frequency differences among respondents who often, rarely or did not eat bushmeat, we used a  $\chi^2$  test. We used PASW 11.0 for all statistical analyses, and alpha was set at 5%.

*Answers across cities.* – An average of  $62.2 \pm 26.2\%$  (median = 68.1) of males and  $72.1 \pm 22.1\%$  (median = 77.5) of females answered that they would not eat bushmeat at all (difference between samples:  $\chi^2 = 0.10$ ,  $df = 5$ ,  $P = 0.999$ ). By contrast,  $12.8 \pm 8\%$  of males and  $8.8 \pm 1.7\%$  of females ate bushmeat regularly (intersexual difference:  $\chi^2 = 0.17$ ,  $df = 5$ ,  $P = 0.998$ ). There were no significant differences for people responding that they ate bushmeat only rarely ( $\chi^2 = 7.79$ ,  $df = 5$ ,  $P = 0.169$ ).

*Answers within cities.* – Frequency of males declaring that they never eat bushmeat was significantly different between cities ( $\chi^2 = 29.13$ ,  $df = 5$ ,  $P < 0.0001$ ), with significantly less persons in Ouagadougou and Lomé stating that they would never eat bushmeat than in the other cities (Fig. 2). Frequency of females declaring that they never eat bushmeat also varied significantly across cities ( $\chi^2 = 27.4$ ,  $df = 5$ ,  $P < 0.001$ ), with a same pattern in Ouagadougou and Lomé as seen for the males.

Frequency of both males and females declaring that they rarely eat bushmeat varied significantly across cities ( $\chi^2 = 24.2$ ,  $df = 5$ ,  $P < 0.0001$  and  $\chi^2 = 23.7$ ,  $P < 0.0001$ ), with Ouagadougou differing significantly from the other cities in that more people than expected answered positively to this question (Fig. 2).

The frequency of males declaring that they frequently eat bushmeat varied significantly across cities ( $\chi^2 = 25.4$ ,  $df = 5$ ,  $P < 0.0001$ ), with significantly more people answering positively to this query option in Lomé than in the other cities (Fig. 2). Frequency of females declaring they ate bushmeat frequently did not differ significantly across cities ( $\chi^2 = 10.1$ ,  $df = 5$ ,  $P = 0.068$ ). In general, younger generations answered that they would never eat bushmeat more often than older age groups, independently of their city of origin (Fig. 3) and gender ( $\chi^2$  test,  $P > 0.500$ ).

Our study is the first to examine bushmeat consumption patterns in large cities in West Africa. Given the large sample of interview responses collected in our study, we are confident that the patterns emerging are significant. Moreover, given the simplicity of our questions, we consider that the chance for significant bias is unlikely. Since all interviews were administered by nationals and in their own language, false interpretations of the sense of the questions by the interviewees were also unlikely. However, certain demographic groups were under-represented in the study sample in at least some cities (for instance, in Ouagadougou, only 7 males of 18-25 years were interviewed), and this may have partially affected our conclusions.

Three clear results emerge from our surveys: 1) about 30% of people eat bushmeat in West African cities, but many of them only occasionally, 2) no difference emerges between sexes, but 3) younger cohorts of both sexes do not consume bushmeat. These patterns demonstrated significant differences in bushmeat consumption frequency between cities and rural areas (Luiselli et al. 2017a, 2017b).

That younger men and women state that they do not eat bushmeat in comparison to the older generations is a crucial finding, since it may indicate a shift in eating patterns, from traditional to ‘modern’ processed foods. This trend may be related to nutritional transition changes in sub-Saharan populations that modernize as a result of socio-economic development, urbanization, and acculturation (Vorster et al. 2011). Informal observations with young interviewees that never eat bushmeat, are visibly non-traditional in their dress sense (dressing exclusively western-style-cloths), go to clubs and discotheques on weekends, use daily social media and smartphones, often their own personal computer, watch every day pay-per-view television channels, and routinely consume fast food (hamburgers, shawarma, pizza). Thus, most of them are deeply influenced by western media, and tend to consider some of their most profound ‘cultural attributes’ (such as bushmeat consumption) as ‘uncool’.

The fact that only a minority of people mentioned they consumed bushmeat in large West African cities is compelling. This is so in spite of: 1) distinct geographic locations, and hence vegetation zone surrounding the cities – forest in Abidjan, Port Harcourt and Calabar, Guinea savannah in Lomé, Sudanese savannah in Ouagadougou and Sahel savannah in Niamey; 2) local culture and ethnicity since many independent ethnic groups participated in our surveys; 3) religion given that Niamey and Ouagadougou are mostly Muslim, whilst Lomé, Port Harcourt and Calabar are almost entirely Christian, and Abidjan mostly Christian but with a considerable Muslim percentage; 4) human development levels, average income in Niamey is much lower than, for instance, in Port Harcourt, and 5) level of ‘westernization’ where Abidjan, Lomé, Port Harcourt and Calabar possess more ‘western’ life-styles in terms of food, media, habits and clothes than Ouagadougou or more so Niamey. Thus, given the above, a unifying reason for the apparent low levels of bushmeat consumption among such a disparate sample of countries could be related to factors such as the supply of bushmeat to urban markets or the impact of the recent Ebola crisis, which caused a collapse in bushmeat consumption in Nigeria (Akani et al., 2015a) and Côte d’Ivoire (Ordaz-Németh et al., 2017). In Ouagadougou, a lack of bushmeat consumption in this city could be related to the fact that this type of meat is illegal and hidden, and that the source areas (mostly protected areas and adjacent buffer zones) are at a considerable distance (Hema et al., 2017). On the other hand, in Nigeria where bushmeat markets are generally open, and close to the main urban centres (for instance, the Oigbo and Omagwa markets for Port Harcourt metropolitan area), social factors may be more important (Akani et al., 2015b).

We predict that, with the ongoing expansion of the cities in West Africa, progressively lesser numbers of people will consume bushmeat on a regular basis. We also suggest that there will be an increasing trend in the people’s attitude towards bushmeat in those cases where growth of urban centres will be very fast. The implications of these developments could be positive for conservation. However, we are aware of the fact that we still need to quantify and



understand whether the volume of bushmeat still consumed in the cities is negatively harming the wild prey populations and depriving rural populations of an important protein resource. In this regard, the eaten species matters very much, as consuming large apes has surely a much dramatic effect for the conservation than eating rodents or other unthreatened species.

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**Compliance with Ethical Standards:** This research project complied with the ethical guidelines developed by the British Sociological Association and *Oryx*.

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**Conflict of Interest:** The authors declare that they have no conflict of interest.

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230   AUTHORS' BIOSKETCHES:

231   ALL AUTHORS have been working since more than 20 years on projects focusing at the interface  
232   between ecology, sociology and conservation biology, in different countries of West Africa. Their  
233   projects are especially focused in the forest region of coastal West Africa, but also in the Sahel  
234   countries, and were carried out in cooperation with leading academic institutions in West Africa and in  
235   Europe.

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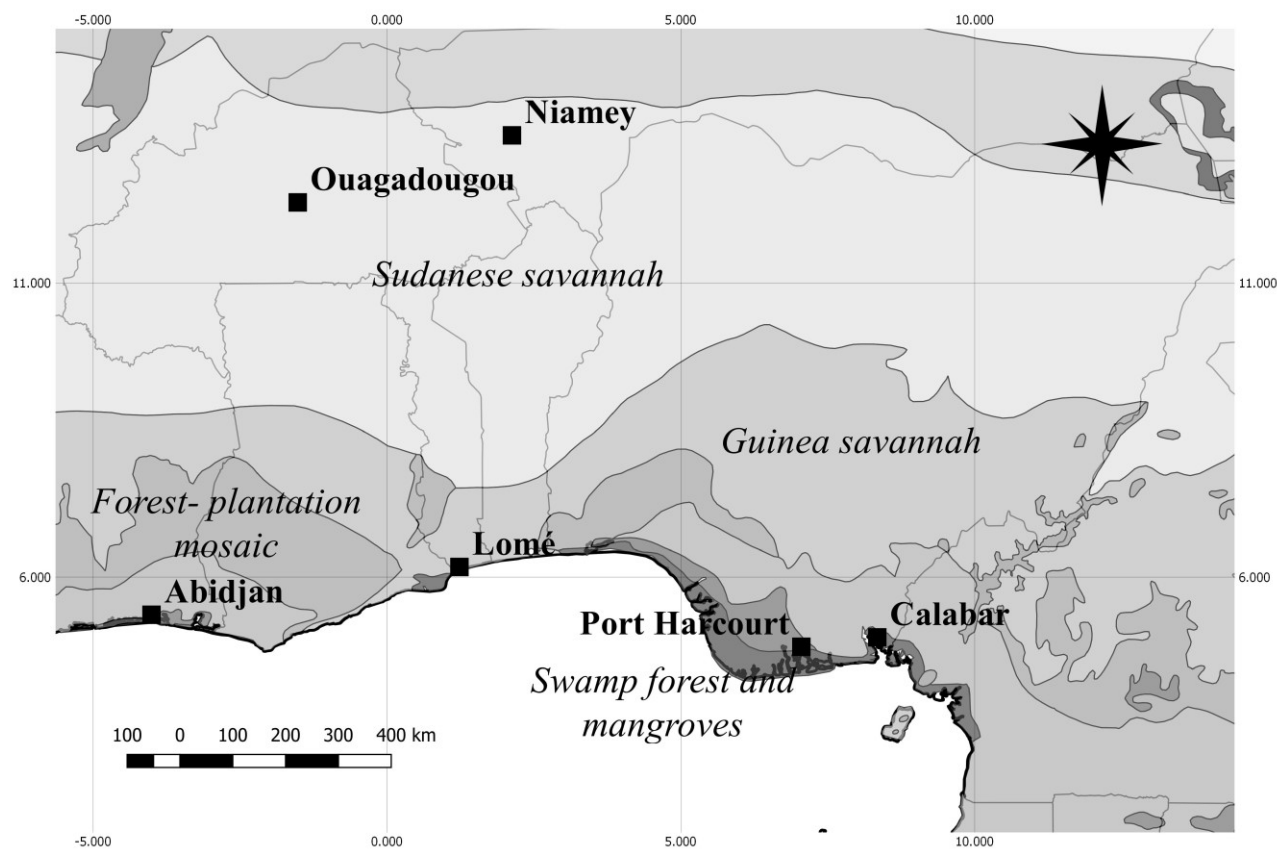
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240 Figure 1. Map of the study region. showing the cities where interview campaigns were done.

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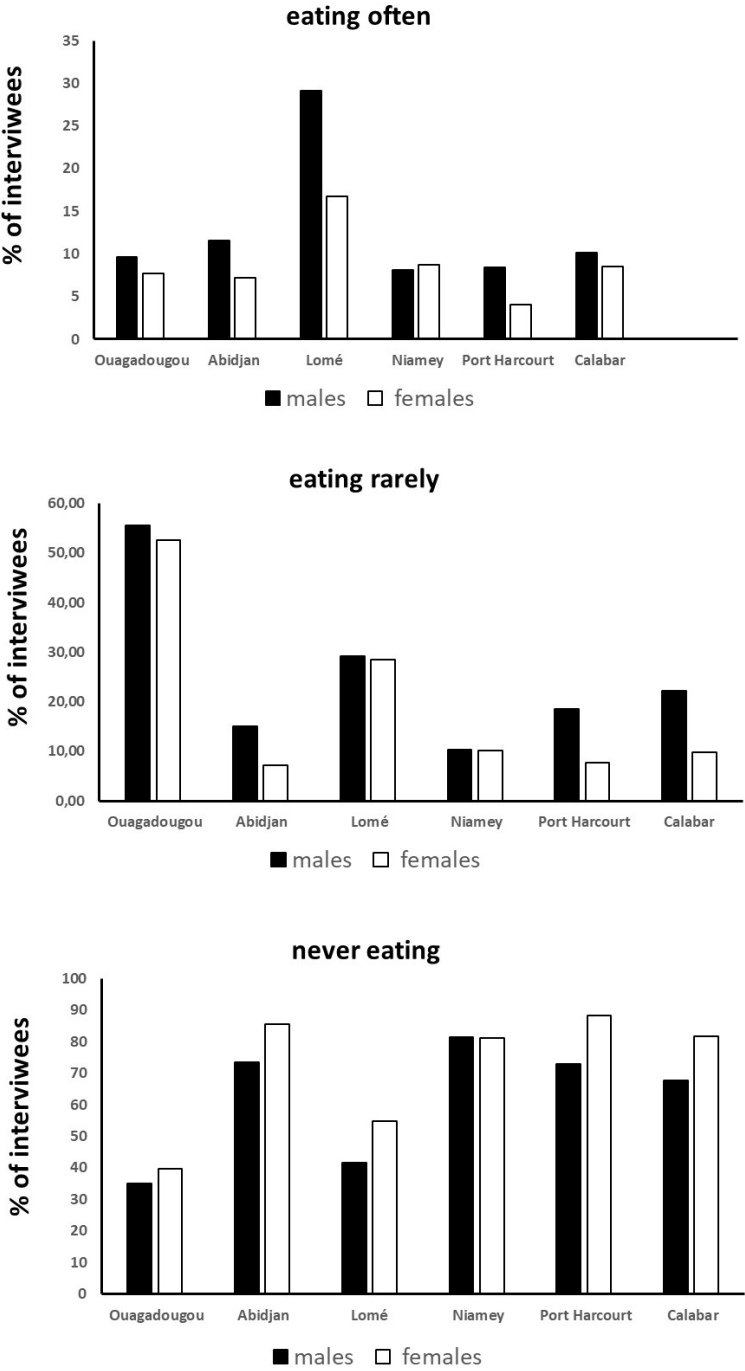


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243 Figure 2. Percent of male and female interviewees giving each of the three potential answers (i.e.. never  
244 eating. eating rarely and eating often) by city.

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247 Figure 3. Distribution (%) of ‘never eating’ answers by age. in the different cities used as survey sizes. Note  
248 that younger generations would never eat bushmeat more often than older generations independently of their  
249 city of origin.

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